CLAIMS

WHAT IS CLAIMED IS:

1. A method for determining an inverse response function of a camera, the method comprising:

finding a first pixel in an output image of the camera in which the first pixel images a first region having a first color and a second region having a second color, the first pixel representing a blended color derived from the first and second colors, wherein the first and second colors serve as component colors of the blended color;

obtaining the camera's measurements of the first and second colors;

obtaining the camera's measurement of the blended color; and

finding a function that maps the measurements of the first, second and blended colors into a linear distribution in a color space.

2. The method of claim 1, further comprising:

finding a plurality of pixels in the output image in which each pixel of the plurality of pixels images two regions of different colors and represents a blended color derived from the different colors, wherein the different colors of each pixel serve as component colors of that pixel's blended color;

obtaining the camera's measurements of the different colors of each pixel of the plurality of pixels;

obtaining the camera's measurement of the blended colors of the plurality of pixels; and

finding a function that maps the measurements of the colors of the first pixel and the plurality of pixels into a linear distribution in the color space.

3. The method of claim 1, wherein the measurement of the first color is obtained from a second pixel that images only the first color.

4. The method of claim 1, wherein the second pixel is adjacent to the first pixel.

5. The method of claim 1, wherein finding a function that maps the measurements of the first, second and third colors into a linear distribution further comprises determining a distance function that minimizes a sum of distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space.

6. The method of claim 2, wherein finding a function that maps the measurements of the colors of the first pixel and the plurality of pixels into a linear distribution further comprises determining the function with dependence on predetermined response functions of known cameras.

7. The method of claim 1, further comprising using a Bayesian estimation algorithm to determine the function.

8. The method of claim 6, further comprising modeling the predetermined response functions as a Gaussian mixture model.

9. The method of claim 5, further comprising incorporating the distance function into an exponential distribution function.

10. The method of claim 2, further comprising finding a maximum a posteriori (MAP) solution formulated as the product of a prior model and a likelihood function, wherein the prior model is a Gaussian mixture model derived from predetermined response functions, and the likelihood function is an exponential distribution function derived from distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space, the inverse response function being derived from the MAP solution.

11. A machine readable medium having instructions for performing the method of claim 1.

12. A system comprising:

an edge pixel detector to find a plurality of pixels in a digital image in which each pixel images a first region having a first color and a second region having a second color, that pixel representing a blended color derived from the first and second colors, wherein the first and second colors serve as component colors of the blended color of that pixel;

a color analyzer operatively coupled to the edge pixel detector, wherein the color analyzer is to obtain measurements of the blended and component colors of the plurality of pixels; and

an inverse response generator to generate an inverse response function that maps the measurements of the blended and component colors of the plurality of pixels into a linear distribution in a color space.

13. The system of claim 12 wherein the inverse response generator is to determine a distance function that, for the plurality of pixels, minimizes a sum of distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space.

14. The system of claim 12, further comprising a datastore to contain reference data comprising predetermined response functions of known cameras, wherein the inverse response generator is to determine the inverse response function with dependence on the reference data of the datastore.

15. The system of claim 14, wherein the inverse response generator is further to use a Bayesian estimation algorithm to determine the inverse response function.

16. The system of claim 14, wherein the inverse response generator is further to model the predetermined response functions as a Gaussian mixture model.

17. The system of claim 13, wherein the inverse response generator is further to incorporate the distance function into an exponential distribution function.

18. The system of claim 12, wherein the inverse response generator is further to determine a maximum a posteriori (MAP) solution as the product of a prior model and a likelihood function, wherein the prior model is a Gaussian mixture model derived from predetermined response functions, and the likelihood function is an exponential distribution function derived from distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space, the inverse response function being derived from the MAP solution.

19. The system of claim 18, wherein the MAP solution serves at the inverse response function.

20. The system of claim 18, wherein the inverse function generator is to determine the MAP function using a Levenberg-Marquardt optimization method.

21. A machine readable medium having components implementing the system as recited in claim 12.

22. A machine-readable medium having components, comprising:

means for finding a plurality of pixels in the output image in which each pixel of the plurality of pixels images two regions of different colors and represents a blended color derived from the different colors, wherein the different colors of each pixel serve as component colors of that pixel's blended color;

means for obtaining measurements of the different colors of each pixel of the plurality of pixels;

means for obtaining measurements of the blended colors of the plurality of pixels; and

means for determining an inverse response function that maps the measurements of the colors of the plurality of pixels into a linear distribution in the color space.

23. The machine-readable medium of claim 22, wherein the means for determining an inverse response function further comprises means for generating a distance function that minimizes a sum of distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space.

24. The machine-readable medium of claim 22, wherein the means for determining an inverse response function is further to determine the function with dependence on predetermined response functions of known cameras.

25. The machine-readable medium of claim 24, further comprising means for modeling the predetermined response functions as a Gaussian mixture model.

26. The machine-readable medium of claim 23, further comprising means for incorporating the distance function into an exponential distribution function.

27. The machine-readable medium of claim 22, further comprising means for finding a maximum a posteriori (MAP) solution as the product of a prior model and a likelihood function, wherein the prior model is a Gaussian mixture model derived from predetermined response functions, and the likelihood function is an exponential distribution function derived from distances of each mapped blended color measurement to a line segment connecting the blended color's mapped component colors in the color space, the inverse response function being derived from the MAP solution.

28. The machine-readable medium of claim 27, wherein the MAP solution serves as the inverse response function.

29. The machine-readable medium of claim 27, wherein the means for finding a MAP solution uses a Levenberg-Marquardt optimization method to find the MAP solution.

30. A method for determining an inverse response function of a camera, the method comprising:

receiving a single image of which at least some of the single image's scene colors are not known a priori;

obtaining a plurality of measured colors from the single image; and

determining a function using the measured colors that maps colors of the single image into a linear distribution.

31. The method of claim 30 wherein the measured colors are selected from a plurality of pixels of the single image, wherein each pixel of the plurality of pixels images a first region having a first color and a second region having a second color;

32. The method of claim 31 wherein a measurement of the first color of a pixel of the plurality of pixels is obtained from another pixel of the single image that is adjacent to the pixel.